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THE

CANADIAN ENGINEER

OF THE

VICTORIA BRIDGE.

BY A MONTREALER.

Montreal:
PRINTED BY JOHN LOVELL, ST. NICHOLAS STREET.
1860.

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INTRODUCTION.

In the description, which was published in 1853, of the first design for the Victoria Bridge, the similarity to the one designed by a Canadian Engineer was evident. In proof of this, Mr. Stephenson in his report of Nov., 1855, remarks that "in the first design for the Victoria Bridge ice-breakers *very similar* to those described in Mr. Keefer's report, were introduced," &c. From the description which appeared in the papers, it was manifest that a very large use was about to be made of the views of the Canadian Engineer; but as no acknowledgment was given, he determined at once to publish his report and plan, for which the consent and assistance of the Hon. John Young (Chairman of the Committee by whom he had been employed) was readily obtained. In his letter authorising the publication Mr. Young said: "as I am most desirous that you should "get full justice as to your ideas respecting the Bridge, "which I know are original with you, and of which "there is a fair chance you are about to be unjustly de-"prived, I beg you will at once report and publish, "addressed to me as late Chairman of the Provisional "Committee of the Montreal and Kingston road, or in "any other way you may see fit so as to get out your "report, and for any expense attending the printing you "can draw on me, and we will trust to Providence to "get it back."

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It is worthy of remark that this report was published, not at the instance of the Grand Trunk Company, the contractors, or of any of their employees, but purposely to protect the claims of the Canadian Engineer, and to meet the question which it was foreseen would arise. No further allusion was made to the subject until 1856, when, after three years of fruitless efforts to obtain simple payment for his survey (which the Company were bound by law to assume) he was compelled to petition the legislature, when he stated that "he was prepared to prove that *the contract for the Bridge was based upon his survey, none other having at that time been made.*" This assertion has never been contradicted;—on the contrary Mr. Stephenson (the arbitrator proposed by Mr. Keefer) at once allowed the amount claimed. Before the report was issued here the proof-sheets were forwarded to Mr. Stephenson, who had been entrusted with the responsibility of the undertaking, and a letter of acknowledgment was received from him, stating that he had not up to that time given any attention to the subject; so that this report (which he has publicly characterised as "an admirable" one) was before him when he matured his plans.

Under these circumstances, the omission (in the opening proceedings which took place last year) of all reference to the Canadian Engineer whose views have been so largely incorporated into the structure, naturally excited the surprise of those who were familiar with its history. The writer of this, who had taken an interest in the Bridge question before the Grand Trunk Company were in existence,—and whose early doubts had been removed by reading Mr. Keefer's report,—published in the *Montreal Gazette*, under his own initials, a letter claiming for the Canadian Engineer equal honor with the English Engineers whose names have been engraved by the Contractors, without the sanction of the Directors, upon the por-

tals of the structure. Shortly after this, a similar omission in the *London Times* of January last, drew out a Canadian gentleman,—one who has been connected with the Press, and is the author of several pamphlets upon the Railways and Commerce of Canada,—who, feeling keenly the injustice done to his countryman, published a pamphlet in London, where he was staying, containing the communications and editorials which had appeared in the Canadian papers, with an introduction and copious extracts from Mr. Keefer's Report, proving the identity between his views therein expressed and the structure as completed.

In consequence of these publications and the discussions to which they gave rise, the Hon. Mr. Allan, a native Canadian and school-fellow of the Engineer, introduced the subject into the Legislative Council in May last, and obtained an unanimous expression of opinion that Mr. Keefer's name should be placed upon the Bridge, beside those of the English Engineers. On that occasion a Director of the Company stated that the Board had had nothing to do with the present inscription, and promised to bring the matter before them at their next meeting. This it is understood has been done; but the Directors, while acknowledging Mr. Keefer's merits, &c., have declined to interfere with the arrangements of their contractors. One of the leading daily newspapers ascribes this inaction to old differences between the contractors and several of the Board on one side, and Mr. Keefer, who it is well known has openly opposed the policy of the Company as to its political connections and consequent unprofitable extensions; as to its guage, as proclaiming non-intercourse with the markets of the Atlantic States;—and as to the control exercised by the contractors in the organization of the Board of Directors and of the Engineer Department, and in the location of the railway.

The challenge thrown down by the friends of Mr. Keefer, in the introduction of this subject into the Legislative Council, the highest body in Canada, cannot be disregarded, even though the explicit statements made in the press of Canada, the scientific journals of the United States and in London, might be overlooked. While, however, discussion is avoided, and it is not known whether the Directors, the Contractors or their Engineer dispute the position assumed for the Canadian Engineer (which is, that all which is peculiar—all which distinguishes this Bridge from any other—is derived from him) the inscription points to an intended though peaceful absorption of his ideas; and his friends are therefore compelled to lay the facts before the public in order that the question may be fully understood at a time when public attention is so prominently directed towards this great work.

PROVINCIAL PARLIAMENT.

LEGISLATIVE COUNCIL.

Reported for the Montreal Gazette.

MR. KEEFER AND THE VICTORIA BRIDGE.

QUEBEC, May 4th, 1860.

Hon. Mr. ALLAN said that before the orders of the day were called, there was a subject to which he desired to call the attention of the House and which he desired the Government to hear. The subject was one connected with the expected visit of His Royal Highness the Prince of Wales to this Province. There were peculiar circumstances connected with the claims which he was about to mention, which rendered the present an appropriate time to draw attention to them. The Railroads, Canals, and Bridges of the Province could compare favorably with those of any other part of the world. Among our Railroads stood prominent that noble road stretching from one end of the Province to the other, the Grand Trunk. This great road however would not be what it is were it not for the connecting link of the Victoria Bridge, the opening of which was the principal object of the approaching Royal visit. Many persons eminent in the sciences, among others of rank and wealth, would accompany His Royal Highness on that occasion. It was true that for many of our public works, the Province was indebted to British capitalists—and especially was the Victoria Bridge so indebted for their timely aid. It was also true that one of England's greatest engineers had given the sanction of his name to the Victoria Bridge. But it was also true that that great work was indebted in the first place for its conception to Canadian skill. To a Canadian engineer was due the first enunciation of the scheme of laying down the present bridge in the place where it now stands. In 1847 Hon. Mr. Young of Montreal and the Finance Minister obtained a survey of the St. Lawrence in order to see if it were possible to erect the bridge. The survey was carried on by an engineer of experience, but this gentleman reported that the scheme of bridging at Point St. Charles was impracticable. At the same time he reported the feasibility of building a bridge over Nun's Island. In 1851 Hon. Mr. Young obtained another survey of the St. Lawrence for the same purpose conducted by Mr. Thos. C. Keefer, an engineer whose talents were well known in the Province. The result of this survey was given in a report published immediately afterwards. In this report Mr. Keefer demonstrated the practicability of erecting the bridge in the place where it now stands. The plans on which the bridge should be

constructed were also laid down. It was recommended that it should be a solid railroad bridge, that it should be erected high over navigation, instead of having draw-bridges in it. A certain distance was to intervene between the piers. It was to be for railroad traffic alone, and lastly, and what was of greatest importance, solid approaches should be constructed to diminish the waterway, instead of enlarging it as might have been proposed, and to guard against the crush of ice. It was worthy of remark that the present bridge was constructed precisely as this report recommended. (Hear.) In consequence of the changes which afterwards took place in the management of the G.T.R. the undertaking was transferred to English hands, and the work in question was constructed by other persons. The Bridge, however, was built in accordance with Mr. Keefer's report. (Hear.) All the leading principles set forth in his report were adopted by the English Engineers. This being the case, he (Mr. Allan) claimed that Mr. Keefer should not be overlooked; that the English Engineer should not receive the whole of that credit, an equal portion of which was due to the Canadian. He claimed for Mr. Keefer that his name should be engraved on the Victoria Bridge beside the names of Stephenson, Ross and the other engineers connected with that work, whose names were already cut upon it. He made this proposition with the greater confidence, because on many occasions the celebrated Stephenson had acknowledged Mr. Keefer's claims with regard to the originating of the work. (Hear.) The Grand Trunk Railroad Company had also acknowledged Mr. Keefer's claims, for they had been compelled to pay him a certain sum for his report, and also for his services; and not only had justice been done to Mr. Keefer by Stephenson and the Grand Trunk Company, but even in the American Railroad Journals credit was given to him—not once but on several occasions. (Hear.) Now in view of all this, Canada ought not to be backward in acknowledging the merits of one of her sons. He (Mr. Allan) laid these facts before the House in order that not only might honorable gentlemen be aware of the true features of the case, but also that they might go forth to the country. There was no doubt that anything that might come from the Government on the subject would have great weight; and he appealed to his Hon. friend the Commissioner of Crown Lands to lend his valuable aid to see justice done in the premises. He believed that it was just one of those subjects which he might venture to bring before the House—especially in view of the event which was soon to take place—the opening of the Bridge; and it was therefore that he ventured to trespass on the time of honorable gentlemen. (Hear)

Hon. Col. PRINCE would ask the hon. gentleman what it was that he suggested? What did he wish to have done in the matter?

Hon. Mr. ALLAN did not like to suggest any positve course to the government. It was well known that the government were in a mea-

sure identified with the Grand Trunk Company, and anything coming from them would not fail to receive proper attention. He thought that Mr. Keefer had a right to have his name engraven on the Victoria Bridge besides the names of other engineers connected with that work.

Hon. Col. PRINCE thought it but fair that Mr. Keefer should get the credit due to him—especially as his clams had been recognized by Stephenson. It gave him pleasure to hear that Mr. Keefer, a Canadian, had a hand in the great work in question. Some time ago he had heard Mr. Keefer's claims advocated—and now he was glad to see them substantiated. It always gave him pleasure to see Canadian talent recognized, and he was glad to state, whether in this instance, or in the law, his own profession, that rising Canadian talent was conspicuous. He trusted that the Hon. Commissioner of Crown Lands would take notice of the matter, and see that justice was done to Mr. Keefer.

Hon. Mr. CRAWFORD confirmed the statement that Mr. Keefer was the first person who had, after the survey, pointed out the spot where the Victoria Bridge now stands. His brother, Mr. Samuel Keefer, also deserved, perhaps, equal credit. With regard to the engraving of the Bridge, he begged to inform the House that the Directors had had nothing to do with it. It had been done by the Contractors. Mr. Hodges had done it of his own accord, and at his own expense. It was true that Mr. Keefer's claims had been acknowledged by Mr. Stephenson, for on that gentlemen sending in his account to the Grand Trunk Company in connection with the Bridge, it was disputed and referred to Mr. Stephenson, who immediately allowed it. With regard to the engraving he did not know how it could be altered now, though he would like to see the names of both the Keefers engraved on the Bridge. He did not know what the Governnent intended to do in the matter. For his own part he would be happy to meet the wishes of the Hon. gentleman who had introduced the subject. He suggested that perhaps Mr. Blackwell, the Vice President of the Company, might be able to manage the matter. He would be glad to hear any suggestions, by which the desired object could be accomplished.

Hon. Mr. SEYMOUR thought that any suggestion coming from the Government, after all the money they had granted to the Company, would go a long way. Mr. Allan deserved a great deal of credit for bringing the subject up ; and he was satisfied that any representation from the government would be attended to. He also bore testimony to the fact that Mr. Stephenson had awarded to Mr. Keefer the credit of initiating the work.

Hon. Mr. DE BLAQUIERE thought the House would in this case, not refuse to accord to a Canadian the credit that was due to him. He trusted that Mr. Keefer's claims would meet with that recognition which they deserved, and that he would be placed in that position which, as a scientific man, he would like to occupy. When we saw the

tributes that were being daily paid to scientific men, no wonder that Mr. Keefer should seek for his share; and the House very well knew, that to a scientific man such a recognition was everything. He thought that under the circumstances it would be impertinent in him to make any suggestion to the Government; but he thought that when the Prince of Wales was about to open the Victoria Bridge, it should be the immediate province of the Government to present to his Royal Highness, among others, an Engineer who had so much to do with the success of that work. (Hear, hear.)

Hon. Mr. VANKOUGHNET as a Canadian was glad of Mr. Keefer's success, and said he was sure it must be gratifying to that gentleman to know that his talents were so highly appreciated in the House. No one could be more anxious to recognize Canadian merit than he (Mr. V.). Perhaps he was even bigoted in the desire to do so. With regard to the claims of Mr. Keefer, he believed that they had been handsomely acknowledged already, as mentioned by other honorable gentlemen, and also by journalists. The Government, he would inform the House, had no power over the Victoria Bridge, but he was sure they would do honor to Mr. Keefer, or to any one who had so distinguished himself as Mr. Keefer had. With regard to the approaching visit, he would repeat what had passed in debate, and of course proper action would be determined on. Even, however, if the matter was to go no further, it would be gratifying to Mr. Keefer to know that the council had mentioned his name so honorably.

Hon. M. CRAWFORD again remarked, in connection with the insertion of Mr. Keefer's name on the bridge among those already engraved, that the letters were engraved on a peculiar kind of stone, and it would destroy all proportion if Mr. Keefer's were inserted; and to put on any other stone would not do. However, he intended to bring the matter before the Directors at their next meeting, which would be on the 23rd of May, after which there would be time enough to make the necessary alterations, if determined on. (Hear, hear.)

The subject then dropped.

Extracts from "Glance at the Victoria Bridge and the men who built it," by CHARLES LEGGE, C. E., *an Engineer employed on the work.*

"The conduct of this important survey was intrusted to Mr. T. C. Keefer, a young Canadian engineer of great talent, but at that time more widely known for the clear, able, and eloquent manner in which, as a writer, he had advocated various public works of utility, than as being the possessor of that practical ability afterwards displayed in the origination and construction of some of the finest hydraulic works on the continent."

" A better selection could scarcely have been made for this work, than the professional gentleman in question, from his intimate acquaintance with the St Lawrence in all its yearly changes, acquired in the prosecution of extensive hydrographic surveys lately carried on for the Provincial Government, together with the schooling obtained as engineer of the works on the Ottawa, a river second only to the one he was now to contend with. In fact, the wisdom displayed in the choice of Mr. Keefer for this onerous office, is abundantly demonstrated by the bold and original views he took of the subject, and the able and scientific embodiment of them in the plans and report laid before the directors."

" The bridge, as thus arranged, contained twenty-two piers and two abutments, with solid approaches from either shore, extending out to a depth of five feet of water, and measuring 1350 feet on one side and 1710 feet on the other, making the entire length of the bridge about 10 thousand feet. This is the first instance in the history of the bridge, of embankments being made use of, and regarded as an essential feature in the design, &c."....

" From this, Mr. Keefer draws the inference, that if the bordage-ice can be retained *in situ* and the taking over of the Laprairie bay expedited, a very large proportion of the supply furnished for the dams would be cut off and their extent correspondingly diminished, which duty he proposed to accomplish by the solid approaches from either side of the river, thus converting them into a source of protection, rather than, as many would suppose, of danger from any anticipated rise of water which might follow their construction. We regret that this occasion does not admit of more than the foregoing imperfect synopsis of this ingenious theory, and the clear and able arguments with which it is substantiated by the originator."

Referring to Mr. Keefer's objections to suspension bridges, Mr. Legge says :

" In thus disposing of this character of roadway Mr. Keefer had the satisfaction afterward of having his views fully and strongly substantiated, as will be seen when we come to the designs as prepared by Messrs. Stephenson and Ross."

" The importance of substituting imperishable for perishable and inflammable material in the erection of this great bridge, was strongly felt by Mr. Keefer, who had in view the tubular principle as discovered and developed by Mr. Stephenson ; but as its adoption would entail an additional expenditure of $2,000,000 he knew it would prove a fatal condition to the then purely private commercial project, if demanded as an essential feature in the design. He insisted however on the centre span being four hundred feet in length and surmounted by a tubular iron beam, at an additional expense of $172,000 than if it were of less width and built of

wood. This he considered essential for the navigation, as well as to afford security against the chimneys of passing steamboats and cutting off communication in the event of fire occurring, thereby exposing only half of the structure to destruction."

"We have endeavoured to give a short accout of this bold proposal for crossing the St. Lawrence, at a point pronounced impraticable by Mr. Keefer's predecessors, but are aware of the utter impossibility in this imperfect sketch of doing the subject that justice to which it is entitled. The idea brought forward of carrying the railway traffic over the St. Lawrence, above the tallest masts of the lake craft, on a structure that would bid defiance to all the powers of the river, must have been as startling to the committee, as was the nearly similar project of Robert Stephenson to the British House of Parliament. It is true, the genius of that illustrious man was to be invoked in the erection of the tube over the channel, and, did the means admit, the remaining tubes likewise; but at the same time, apart from this, every unprejudiced mind must admit, as did Stephenson himself, that an enormous stride towards success had been taken by Keefer; that he had in fact solved the problem, in reducing the question from a dead impossibility to a living certainty. The father of the bridge and his friends could now exult in this successful result as an earnest of what must speedily follow."

As a proof of the similarity between the present structure and that designed by Mr. Keefer, the following is taken from the tabular statement in Mr. Legge's work.

Names of Engineers.	Description of Structure.	Total length.	Greatest headway above water.	Least headway above water.	No. of spans.	Water-way of span over channel.	Water-way of remaining spans.	Length of solid approach.	Length of superstructure.
Mr. T. C. Keefer.....	Stone & Iron....	10000	100	45	23	400	250	3060 abuts.	6940
Stephenson & Ross.....	Stone & Iron....	9184	60	36	25	330	242	2600	6594

Extract from "A Brief History" of the Victoria Bridge, by F. N. Boxer, Esq., C. E. (*pp.* 27-28.)

"To Mr. Keefer was Mr. Stephenson indebted for all the valuable data collected and mentioned in Mr. Keefer's Report, and this Engineer is justly entitled to the full credit of having designed the first plan of a bridge over the St. Lawrence which could have been successfully carried into effect, as has been subsequently proved by the construction of the Victoria Bridge on nearly the same site."

OPINIONS OF AMERICAN ENGINEERS.

From the Railway Times, Boston.

The original design of this bridge is due to a Canadian Engineer, Thomas C. Keefer Esq., whose published Report in 1852 fixes the site and determines the general arrangement of the structure, which has been but little modified in execution. He also in a long and elaborate argument, demonstrates, as far as such a thing could be done on paper, that a bridge could be built to resist the ice, and that its effect would be to diminish instead of increasing the winter floods.

Such was the state of the enterprise in 1852, but the bridge would probably not have been built had it not been undertaken by the Grand Trunk Railway Company and adopted as part of their vast scheme.

The late Mr. Stephenson came to Canada, and after examining the proposed location and plan with great care, gave Mr. Keefer's views the sanction of his great name, and assumed the responsibility of constructing the bridge. Had he given an adverse opinion, it is not too much to say that the capital would never have been raised in England. As his whole professional reputation was at stake, he gave the closest attention to the details of construction. All the working drawings were made in his office at Westminster, and bear the signature of his principal assistant, G. A. Stephenson, and no alterations were permitted without his sanction. Some of the friends of Mr. Stephenson's resident engineer in Canada, Mr. A. M. Ross, have claimed for him the credit of the design. Mr. Stephenson's friends deny this point blank. Mr Ross himself has said nothing. The bridge bears a tablet on which is engraved, in lasting characters, the names of Robert Stephenson and A. M. Ross, engineers. In the absence of futher evidence, we must declare that the honor of designing this huge structure lies with Keefer, Stevenson and Ross ; how much belonging to each, perhaps it would be unprofitable to enquire.

From the Railroad Journal, New York

In 1851, Mr. Thomas C. Keefer, a Canadian Engineer, was employed by the Montreal and Kingston Railroad Co., to examine the site with a view to an estimate of cost upon some definite plan. Probably no person could have been selected better able to measure, safely, the difficulties to be encounterd from the phenomena referred to. Mr. Keefer had for years been familiar with the locality, and his experience had been extensive upon the Canadian rivers. The *ice* phenomena had been his study, and the very able report made by him in 1853 showed that he fully understood his subject."

In concluding a long article, the writer, speaking of Mr. Keefer says:

The whole matter had been carefully considered by the most experienced and competent engineer in Canada, who was " to the manner born," and who saw the whole thing in a correct light.

REPORT OF AN ENGLISH ENGINEER.

[Although the first design for the Bridge adopted the wooden icebreakers proposed by Mr. Keefer, this was subsequently changed and these were made of stone and attached to the pier. In defending this change it was said that this cribwork "would occupy 25 per cent. of the water breadth of the river," and this was given as "one of the most prominent reasons for their abandonment." It is but justice to Mr. Keefer to call attention to the fact that, after having tried other methods, the plan of cribwork cofferdams as proposed by him was found to be the most efficient, and by these the greater part of the work has been done. The debris of these dams remains, and is likely to remain, so that a greater portion "of the water breadth of the river" is now occupied, than in his plan. The question naturally arises, whether, had it been foreseen that this expense and obstruction could not be avoided, the English Engineers would not have held to their first design and have converted these cribs into icebreakers, and thereby diminished the cost of the masonry in the piers and abutments.]

Mr. Chas. Liddell, the Engineer of the Crumlin Viaduct, in his report thus alludes to this subject:

Mr. Keefer proposed that the "shoes" should serve during the construction of the bridge as *coffer-dams*, "*composed of the cheapest materials.*" Mr. Ross, Paragraph 17, reminds us that from "the description he has "given of the nature of the foundations to be dealt with, he need not "recount the difficulties which, under such circumstances, would present "themselves" to making use of the crib-work shoes as coffer-dams.

In Paragraph 19, Mr. Ross says, "*our present dams* are generally about "5 to 6 feet above summer-water level, and *cover an area corresponding* "*nearly with that described; latterly we have constructed them similar to* "*these, filling the external barrier* [of wood cribs] *with stone and the inner* "*with clay, necessary to render them water-tight.*"

And thus it appears that in the course of writing the short Paragraph 18, the difficulties which "the large boulders heaped together, forming "the bed of the river in most parts, the interstices filled with gravel, "sand, and mud" presented, and which he thought it needless to "recount" have vanished, and his present dams are similar to Mr. Keefer's shoes, and have been rendered water-tight by the usual simple means of clay-puddle filled into the inner cribs.

The assertion in Paragraph 18 that "these quarter-acre islands would "occupy 25 *per cent.* of the water breadth of the river," must not, for Mr. Keefer's sake, be passed unnoticed. Mr. Keefer proposed 22 clear spans of 240 feet, with one of 400 feet.

The Victoria Bridge is to consist of 24 spans of 242 feet clear, and one of 330 feet. The difference in *water-way* then of the two designs is only 458 feet; or, the water-way between the "islands" was 7 per cent. less than between the proposed piers.

Now, considering that since the contract for the Victoria Bridge was made, a reduction in water-way has been made to the extent of 1332 feet, or three times the difference between the water-way proposed by Mr. Keefer, and that now adopted, this allusion to the proportion occupied by the "islands" does not bear examination.

From the Toronto Globe, June 30, 1860.

THE VICTORIA BRIDGE.

The Hamilton *Spectator* informs its readers that the Hon. John Ross does not intend to place Mr. Keefer's name upon the Victoria Bridge, notwithstanding the unanimous feeling displayed in the Legislative Council in favour of this measure of simple justice. Mr. Ross, it appears, thinks that the Canadian Engineer should be satisfied with the very general expression of opinion in his favour by the press and the country; but in this he is manifestly inconsistent, for, if deserving of so much, he is equally entitled, with the English engineers, to the permanent record of his merits. A Director of the Company stated in his place in the Legislative Council that the contractors had arranged the inscription, and the *Spectator* truly says, "this is a sufficient explanation why no mention of Mr. Keefer's name was made, for he has been bitterly opposed to and by the contractors." As our contemporary does not go further upon a delicate point, we will supply the omission. When in 1855 additional aid was granted to the Grand Trunk Railway Company, the Legislature, suspicious of the management, insisted that the road should be examined by engineers not connected with the Board of Works or the Railway Company, and Mr. Cayley agreed that Mr. Keefer (who was unconnected with the contractors or the Government) should be employed for the purpose. This promise was fulfilled so far as that the appointment was made, during the absence of the Hon. John Ross in England; but the contractors' agents succeeded in delaying action until his return, when it was revoked, the Conservative section yielding to the Hincksites of the Cabinet. Two contractors' engineers were appointed, and "things were made pleasant" all round. Everything was found right, and the money was paid. On the re-assembling of the Legislature, however, explanations were demanded, and were so awkwardly given as to call from Mr. Keefer a prompt and decisive disproval of the sincerity of the reasons alledged by members of the Government in the Upper and Lower Houses, both of whom are now Directors of the Grand Trunk Railway. Attacked by the contractors and their Hincksite allies for this presumption, he replied, and proved that the inspecting engineers were really

the nominees of the Grand Trunk Railway contractors, and that the inspection was a sham. He said the road had been located to cheapen the cost to the contractors (who had appointed one of their own servants as the Company's engineer) and to promote land speculations. Also, that the curves and inclines were more numerous than they should be, and the latter steeper than the contract allowed. Time has proved the truth of all these assertions. Miles of the railway between Cobourg and Port Hope have been abandoned, and the road is taken back upon the original survey made by Mr. Keefer; while in other places a large expense has been incurred to protect it from the Lake. At Port Britain the road was, to its manifest injury, brought down to the water level in a foolish attempt to build up a new harbour on Lake Ontario; and at other points stations have been established for the purpose of selling lots—to the destruction of local traffic, it being as easy and cheap to travel by the old roads from town to town as to get on and off the Railway.

Another circumstance which excited the hostility of influential parties was that in some lectures delivered before the University of McGill College, Montreal, previous to the explanations referred to, Mr. Keefer exposed the manner in which railway contractors, directors, and engineers might combine for the purpose of plundering shareholders and municipalities, and warned young engineers against such corrupting influences. Although there was nothing personal in these lectures, he was bitterly assailed for his outspoken views; and considering how difficult of proof such rascalities are, many respectable persons no doubt thought that the statements were over-drawn. But the revelations which followed the death of a large contractor in the West, showed not only the weakness of human nature, but the enormous sums contractors can afford to pay to a single individual, and the great temptation to which our public men are consequently exposed. In the controversy which followed this *exposé*, he did not spare either Ross the president, or Ross the engineer, or the contractors who had appointed them both; and we are not therefore surprised that they should now oppose the demand made on his behalf by the press and in the Legislature.

....

Judging the comparative merits of the surviving engineers by the above authorities few will dispute that in putting the English engineers' names on the Bridge portals and in leaving the Canadian's off, gross injustice has been done; and although the contractors and their friends in the direction will no doubt succeed in punishing him for his want of subserviency, we believe with the Quebec correspondent of the *Pilot*, that Mr. Keefer's name "will be engraved on the heart of every sensible "man" who understands anything of the subject.